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Pre-Employment Vocational Education and Training in Korea

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Abstract: The Korean vocational education and training (VET) system is heralded as one of the key factors contributing to the country's past economic growth. VET has played an important role in developing a skilled labor force during Korea's economic development. However, with the increasing importance of higher education and general education, the status of VET in the country is declining. This paper explores recent Korean data to analyze the labor market outcomes of pre-employment VET institutions. The findings show that current vocational high school education is not associated with better labor market outcomes, in terms of employment rate, wage levels, prospect of permanent employment, and transition to the first job, when compared to general high school education. Among VET programs, we find that graduates of higher level, more comprehensive VET programs experience greater labor market achievements than graduates of less competitive, shorter programs. We also find that the VET institutes play an important role in supplying technical labor to small and medium enterprises (SMEs).

JEL Classification: J24, J31, J65

Keywords: pre-employment VET, labor market outcomes, Youth Panel, KEEP (Korean Education and Employment Panel), Employment Insurance database

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Introduction

The vocational education and training (VET) system in Korea has been evaluated to supply skilled human capital needed for rapid economic development at the right time at the right place. However, the status of the VET track is weakening in Korea as higher education becomes more important and general education becomes more attractive for students and their parents complying with continuous economic development. The declining status of VET is not only of importance to Korea but also to most developed countries. While the circumstances might be serious in Korea, precise international comparative studies are needed in order to draw conclusions.

Although it is generally agreed that the VET system in Korea has contributed to economic development in the past, a shortage of related data precludes supporting this judgment vis-à-vis precise analysis. Our analysis therefore shifted to the current time, utilizing the readily available related data. This study might reveal a more negative side of the VET system, as the attractiveness of VET has been weakened as time progresses/ in the more recent years. Nevertheless, it is expected to suggest some useful points to developing countries trying to rebuild their VET systems, because, even though the VET system is relatively important given their developing stage, they are also facing with a situation to have to reinforce higher education complying with the global diffusion of the knowledge-based economy. In other words, it might be said that the attractiveness of VET in present developing countries is relatively weaker than in past developing countries.

This study describes labor market performance of pre-employment VET in Korea. The first section explains the pre-employment VET organizations in Korea. Section 2 analyzes labor market performance of the vocational high school – the vocational education and training institution at secondary schools - using data from the Youth Panel survey data from the Korea Education and Information Service and the Korean Education and Employment Panel survey data from the Korea Research Institute for Vocational Education and Training. Section 3 analyzes the labor market outcome of post-secondary, pre-employment VET institution graduates, using the Employment Insurance database. Section 4 summarizes the analysis results and proposes the policy implications.

I. PRE-EMPLOYMENT VOCATIONAL EDUCATION AND TRAINING INSTITUTES

Pre-employment vocational education and training (VET) institutes can be classified into two types. The first type is the vocational education institute belonging to the official educational system that is supervised and managed by the Ministry of Education, Science and Technology; it includes the vocational high school and the junior college. The second type is the vocational training institute designed for human resource development, which includes the Korea polytechnic colleges (KoPos) and the Human Resource Development Institutes in the Korea Chamber of Commerce and Industry (KCCI). The following section covers these organizations.

1.1. Vocational High School

The vocational high school is the representative vocational educational institute at the secondary school level. The disciplines within the system are: agriculture, technical, commerce, fishery and marine, vocational home economics,¹ and comprehensive studies.² In 1998 there were 772 vocational high schools whereas in April 2007 there were only 702, representing 32.4 percent of all high schools. Inversely, the trend in the number of general high schools increased steadily. Since the mid-1990's, the proportion of vocational high schools has decreased while that of general education has increased.

When analyzing vocational high schools by discipline, the proportion of commercial, comprehensive, and agricultural high schools decreased while those of technical and vocational home economics increased. As of April 2007, the technical, commercial, and comprehensive high schools represented 30.2, 28.3, and 26.9 percent, respectively.

¹ Combines more than two departments among agriculture, technical, commerce, fishery and marine, or home economics department, or has the home economics department.

² Offers both the general and vocational course.

Table 1. Vocational High Schools: School Type

	1990		1995		2000		2001		2005		2007	
Agricultural	55	9.4	29	3.8	26	3.4	27	3.6	31	4.3	25	3.6
Technical	104	17.7	175	23.0	203	26.6	209	27.5	212	29.7	212	30.2
Commercial	208	35.4	248	32.5	238	31.2	225	29.6	212	29.7	199	28.3
Fishery and Marine	9	1.5	9	1.2	8	1.0	8	1.1	8	1.1	7	1.0
Vocational Home Economics	16	2.7	62	8.1	75	9.8	73	9.6	64	9.0	70	10.0
Comprehensive	195	33.2	239	31.4	214	28.0	217	28.6	186	26.1	189	26.9
Total Vocational High School	587	100.0	762	100.0	764	100.0	759	100.0	713	100.0	702	100.0
General High School	1,096		1,068		1,193		1,210		1,382		1,457	

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year.

Government policies have had direct impacts on the number of students attending vocational high schools. The 50:50 policy was a driver of increased attendance through the mid-1990's; thereafter, a change in policy reversed the trend. Of all high school students (1,841,374), 484,011 – or 26.8 percent – attended vocational high schools as of April 2007. Other impacting factors were a decrease in the school-age population and an increase in students proceeding to higher education.

Table 2. Vocational High School Students: School Type

	1990		1995		2000		2001		2005		2007	
Agricultural	40,646	5.0	21,338	2.3	17,874	2.4	16,792	2.6	16,846	3.3	13,737	2.8
Technical	191,980	23.7	273,683	30.0	265,837	35.6	231,716	35.6	187,092	37.2	186,096	37.7
Commercial	370,889	45.8	355,504	39.0	272,650	36.5	227,710	35.0	171,903	34.2	162,988	33.0
Fishery and Marine	9,336	1.2	6,791	0.7	5,607	0.8	5,016	0.8	4,472	0.9	4,043	0.8
Vocational Home Economics	16,706	2.1	65,653	7.2	57,683	7.7	49,548	7.6	33,857	6.7	37,191	7.5
Comprehensive	181,094	22.3	188,484	20.7	127,335	17.0	120,416	18.5	88,934	17.7	89,956	18.2
Total Vocational High School	810,651	100.0	911,453	100.0	746,986	100.0	651,198	100.0	503,104	100.0	494,011	100.0
General High School	1,473,155		1,246,427		1,324,482		1,259,975		1,259,792		1,347,363	

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year.

Over the last two decades, the career path among graduates of vocational education has trended toward higher education rather than employment (see Table 3). While the percentage of vocational high school graduates who entered the labor market plummeted from 76.6 percent in 1990 to 20.2 percent in 2007, the percentage of secondary school graduates who pursued tertiary studies increased over 60 percentage points, from 8.3 percent in 1990 to 71.5 in 2007. The career path of VHS graduates clearly has shifted.

Table 3. Vocational High School Graduates: Career Path

	1990		1995		2000		2001		2005		2007	
Advancement to Higher Schooling	22,710	8.3	49,699	19.2	122,170	42.0	121,411	44.9	115,164	67.6	113,487	71.5
Employed	210,113	76.6	190,148	73.4	149,543	51.4	130,968	48.4	47,227	27.7	32,075	20.2
Enlisted	1,402	0.5	333	0.1	523	0.2	481	0.2	393	0.2	435	0.3
Unemployed	16,108	5.9	7,582	2.9	10,508	3.6	10,140	3.8	4,327	2.5	8,777	5.5
Unknown	23,817	8.7	11,371	4.4	8,303	2.9	7,393	2.7	3,148	1.8	3,934	2.5
Total	274,150	100.0	259,133	100.0	291,047	100.0	270,393	100.0	170,259	100.0	158,708	100.0

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year.

1.2. Junior College

The junior college is “the short-term higher educational institute designed to develop middle-standing workers needed in various social areas. It is designed to cultivate professionals and specialists required for Korea’s national and social development in various areas.”³

The number of junior colleges also experienced a rise and fall. Junior colleges increased steadily throughout the 1990s and peaked at 161 schools in 1999. By 2007, however, a combination of economic stagnation and government policy suppressing the licensure of junior colleges caused the number to drop to 148. In Korea, junior colleges are mainly private institutions (92.6 percent in 2007), as compared to national and public colleges.

Table 4. Number of Junior Colleges

	1990		1995		2000		2001		2005		2007	
National	16	13.7	7	4.8	7	4.4	7	4.4	6	3.8	3	2.0
Public	-	-	1	0.7	9	5.7	9	5.7	8	5.1	8	5.4
Private	101	86.3	137	94.5	142	89.9	142	89.9	144	91.1	137	92.6
Total	117	100.0	145	100.0	158	100.0	158	100.0	158	100.0	148	100.0

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year.

The junior college educates middle-standing professionals in various industrial sectors by running engineering, natural sciences, medical sciences and pharmacy, the arts and physical education departments as well as the humanities, social sciences, and education departments. The duration of course work is two to three years, with nursing, medical treatment, and health comprising the mainstay of three-year programs. The curriculum is composed of basic major subjects in the first year and in-depth major subjects in the second and third years; 68 credits are required in order to graduate. In addition, junior colleges oversee the night school courses commissioned by industry in order to provide an

³ Higher Education Law, Article 47.

opportunity for industrial workers to continue their education.

The number of junior college students increased until 2002 when enrollment peaked at 963,129. Thereafter, the general decrease in the number of high school graduates caused an overall decrease in enrollment in junior colleges, with 795,519 students in 2007.

Table 5. Junior College Students: Academic Field

	1990		1995		2000		2001		2005		2007	
Humanities	10,419	3.2	25,114	4.4	34,952	3.8	40,178	4.3	32,905	3.9	30,813	3.9
Social Sciences	58,441	18.0	118,505	20.8	183,717	20.1	179,645	19.4	184,542	21.6	191,285	24.0
Education	13,859	4.3	16,941	3.0	24,781	2.7	21,804	2.4	32,097	3.8	30,961	3.9
Engineering	134,195	41.4	254,005	44.6	397,449	43.5	425,653	46.0	308,693	36.2	260,067	32.7
Natural Sciences	40,620	12.5	40,472	7.1	85,212	9.3	58,082	6.3	61,854	7.3	55,918	7.0
Medical Sciences and Pharmacy	37,532	11.6	56,142	9.9	73,064	8.0	74,433	8.0	88,871	10.4	92,121	11.6
Arts and Physical Education	28,759	8.9	58,641	10.3	114,098	12.5	126,168	13.6	144,127	16.9	134,354	16.9
Total Junior College	323,825	100.0	569,820	100.0	913,273	100.0	925,963	100.0	853,089	100.0	795,519	100.0
University	1,040,116		1,187,735		1,665,398		1,729,638		1,859,639		1,919,504	

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year.

Analyzing the career path of junior college graduates, the percentage of the employed rose to 80.8 percent in 2007 from 54.0 percent in 1990. Four primary factors explain this phenomenon: (i) junior colleges developed training courses that closely correlated to jobs in the industrial sector; (ii) academic-industrial cooperation strengthened the links between education and industry; (iii) a number of forward-looking specialized courses were designed to meet future global-market needs, thus elevating employment prospects; and, (iv) greater effort was made to increase vocational guidance.

Table 6. Junior College Graduates: Career Path

	1990		1995		2000		2001		2005		2007	
Advancement into Higher Schooling	6,718	7.7	9,972	7.0	14,817	6.6	16,430	7.1	12,221	5.3	8,234	3.8
Employed	47,094	54.0	88,843	62.1	159,960	71.6	170,986	73.4	177,919	77.8	173,804	80.8
Enlisted	14,840	17.0	13,339	9.3	7,149	3.2	5,423	2.3	3,498	1.5	1,814	0.8
Unemployed	12,330	14.2	21,017	14.7	31,72	14.2	32,246	13.8	31,439	13.7	27,527	12.8
Unknown	6,149	7.1	9,904	6.9	9,834	4.4	7,887	3.4	3,686	1.6	3,661	1.7
Total	87,131	100.0	143,075	100.0	223,489	100.0	232,972	100.0	228,763	100.0	215,040	100.0

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year.

1.3. Korea Polytechnic Colleges

The Korea polytechnic college (KoPo) is the junior college founded by education-related laws to develop technicians. KoPos perform various roles: cultivation of the industrial workforce focusing on field and practical work (technicians, craftsmen, and master-craftsmen), training of the unemployed, vocational competency development training for incumbent workers, and taking on a role similar to that of local community colleges in the U.S. In 2006, 24 polytechnic colleges and 21 vocational training centers were integrated into 11 colleges by region.

1.3.1. Craftsmen Training Programs

The craftsmen training program is a one-year course designed to nurture creative and forward-looking industrial human resources that are required by the country and the industrial society. Eligible candidates include non-college-bound youth, the unemployed, and women; no academic qualifications are required. In addition, there is no training fee, and the trainee receives a training allowance.

The craftsmen training program encompasses key national industries and knowledge-based jobs. It provides 1,400 hours of classes per year, composed of 140 hours of general theory, 280 hours of theory in a specialized field, and 980 hours of practice in the specialized field.

In 1999, there were 7,592 graduates in the program; thereafter the field experienced a gradual decline with only 5,475 persons graduating in February 2007. The percentage of employment among graduates varied according to discipline (employment rate 1) but was roughly 60 percent of all graduates in any given year. However, excluding those who did not search for jobs because of military service or higher education, the employment rate (employment rate 2) was around 90 percent, which is quite high.

Table 7. Craftsmen Training Program Graduates: Employment Rate

	Graduates (A)	Job-Searching Graduates (B)	Employed (C)	Employment Rate 1 (C/A)	Employment Rate 2 (C/B)	Non-Job-Searching Graduates (A-B)*
1997	6,783	5,563	5,563	82.0	100.0	1,220
1998	6,343	4,751	4,551	71.7	95.8	1,592
1999	7,592	4,436	4,015	52.9	90.5	3,156
2000	7,331	4,550	4,479	61.1	98.4	2,781
2001	7,074	4,206	4,072	57.6	96.8	2,868
2002	7,442	4,680	4,533	60.9	96.9	2,762
2003	6,952	3,993	3,782	54.4	94.7	2,959
2007	5,475	4,081	3,484	63.6	85.4	1,394

Note: Those graduates who did not search for jobs because of military service or higher education.

Source: Ministry of Labor, Review of Vocational Ability Development Project (2003); Korea polytechnic colleges foundation internal document (2007).

1.3.2. Technician Training Programs

The two-year technician training program is designed to develop multi-skilled engineers in key national industries and the new industries that the private training institutions cannot provide on their own. Eligibility includes high school graduates or those with equivalent academic qualifications. A graduate of the program receives a Bachelor of Industry accredited by the Ministry of Education, Science and Technology, which is similar to the Bachelor's degree awarded to junior college graduates.

The technician training program is comprised of the following disciplines: information/electricity, electronics, machinery/metal, construction/industrial application, design/textile department. The curriculum has a 40:60 theory-practice component, and students are required to have 108 credits to graduate.

The number of program graduates was 2,599 in 1998 and steadily increased to 6,753 in 2007. Of these, over 60 percent were employed in 1998 (employment rate 1), compared to all other graduates. In 2007, the figure was 67.9 percent. Analyzing job-searching graduates only, the employment percentage reaches almost 100 (employment rate 2). In 2007, it decreased slightly to 89.9 percent.

Table 8. Technician Training Program Graduates: Employment Rate

	Graduates (A)	Job-Searching Graduates (B)	Employed (C)	Employment Rate 1 (C/A)	Employment Rate 2 (C/B)	Non-Job-Searching Graduates(A-B)
1998	2,599	2,108	2,063	79.4	97.9	491
1999	3,152	2,176	2,176	69.0	100.0	976
2000	3,918	2,143	2,143	54.7	100.0	1,775
2001	5,039	3,100	3,100	61.5	100.0	1,939
2002	6,193	4,019	4,019	64.9	100.0	2,174
2003	6,674	4,323	4,307	64.5	99.6	2,351
2007	6,753	5,101	4,586	67.9	89.9	1,652

Note: Those graduates who did not search for jobs because of military service or higher education.

Source: Ministry of Labor, Review of Vocational Ability Development Project (2003); Korea polytechnic colleges foundation internal document (2007).

1.4. Human Resource Development Institutes in the Korea Chamber of Commerce and Industry

The Human Resource Development Institutes of the Korea Chamber of Commerce and Industry (KCCI) runs eight centers nationwide to develop industrial human resources for three main purposes: (i) to match the demand of the member companies, (ii) to supply technical human resources to small- and medium-sized enterprises, and (iii) to expand the opportunity of youth to learn specialized technologies.

The regular course is two years,⁴ and all training expenses are supported by the government. Those eligible to apply are high school graduates and persons under 29 years of age with equivalent academic qualifications. The total number of required hours is 2,800, with 30 percent theory and 70 percent practice. The industrial areas covered by the course include machinery, electricity, electronics, information and communications, construction, and furniture-making.

The number of KCCI graduates increased steadily and since 2000, the number has remained at approximately 2,000. The percentage of graduates going into employment (employment rate 1) was continuously higher than 80 percent (with the exception of the early establishment period). For graduates intending to get a job, the employment rate (employment rate 2) was remarkable in that all graduates were employed.

Table 9. KCCI Two-Year Course Graduates: Employment Rate

	Completed Training (A)	Job-Searching Graduates (B)	Employed (C)	Employment Rate 1 (C/A)	Employment Rate 2 (C/B)	Non-Job-Searching Graduates (A-B)
1995	806	611	611	75.8	100	195
1996	1,032	817	817	79.2	100	215
1997	1,469	1,291	1,291	87.9	100	178
1998	1,884	1,666	1,666	88.4	100	218
1999	2,002	1,782	1,782	89.0	100	220
2000	2,013	1,612	1,612	80.1	100	401
2001	1,956	1,651	1,651	84.4	100	305
2002	2,063	1,810	1,810	87.7	100	253
2003	1,927	1,657	1,657	86.0	100	270

Note: Those graduates who did not search for jobs because of military service or higher education.

Source: Korea Chamber of Commerce and Industry, Human Resources Development Office internal document (2003).

In 1998 the Ministry of Education, Science, and Technology accredited the Human Resource Development Institutes in the Korea Chamber of Commerce and Industry. A graduate of the two-year regular course that covers 20 job categories receives credit toward a Bachelor of Industrial Engineering. The graduate also becomes eligible to matriculate into the junior course of the four-year regular university.

⁴ Some departments run a one-year course.

II. LABOR MARKET PERFORMANCE OF VOCATIONAL HIGH SCHOOL EDUCATION

2.1. Introduction

What are the labor market outcomes resulting from the entry of vocational high school (VHS) graduates, both a fast and a delayed entry? For the VHS graduates who had a fast entry that is, the non-college-bound, what were the labor market outcomes for the period from 2001 to 2006? And, can the derived analysis serve as a future guideline? To better answer these questions, non-college-bound general high school (GHS) graduates were identified and analyzed as a control group. For the VHS graduates who matriculated into junior colleges and thus delayed entry into the labor market, what were the respective outcomes? Again, the parallel movement of GHS graduates served as a control group.

To pursue the above analyses, two panel data were used. The Youth Panel survey of the Korea Employment Information Service (Youth Panel) collected data from the first wave conducted in 2001 to sixth wave conducted in 2006 (i.e., five years of data). The Korean Education and Employment Panel survey data from the Korea Research Institute for Vocational Education and Training (KEEP) was amassed from the first wave in 2004 to the third wave in 2006 (i.e., three years of data). The Youth Panel readily allowed for the study of both cohorts (i.e., all non-college-bound high school graduates and all junior college graduates) who were between the ages of 19 and 35 years old at the time of the study. In contrast, the KEEP data was limited to the non-college-bound high school graduates, and it had to be extracted from among high school seniors beginning with the first wave. The literature being heretofore scant, these two panels established the data necessary for an in-depth analysis and to arrive at logical conclusions.

In particular, this analysis undertakes a threefold study of the labor market outcomes of vocational high school graduates. It reviews the employment status quantitatively by comparing the percentage of employed graduates for each cohort with those of their respective control group (i.e., the non-college-bound VHS and GHS graduates and the junior college-bound VHS and GHS graduates). It then analyzes, while controlling for other conditions, whether the type of high school significantly affects the difference. The second tranche reviews the quality of employment, weighting wages and permanent employment as a major index. Finally, the third tranche compares the facility of vocational versus general high school as means of transitioning to the first job. In sum, the robustness of the study rests on this multi-dimensional approach toward the data and toward the realities on-the-ground.

2.2. High School Graduates Who Did Not Proceed To Higher Education

2.2.1. Current Employment Status

Analyzing the percentage of employment (as of July–November 2006) among the youth who did not proceed to higher education after high school graduation, based on the Youth Panel, there seems to be no significant difference between the employment rate of general high school graduates and that of vocational high school graduates. The employment rate of general high school graduates was 58.5 percent and that of the vocational high school graduates was not greatly different at 59.6 percent.

Table 10. Non-College-Bound High School Graduates: Employment Rate by High School Type
(Unit: Person, Percent)

	Employed	Not Employed	Total
General High School	131 (58.5)	93 (41.5)	224 (100.0)
Vocational High School	245 (59.6)	166 (40.4)	411 (100.0)
Total	376 (59.2)	259 (40.8)	202 (100.0)

Note: Employment rate difference between two school types is not significant (χ^2 -test, $p=0.7822$). Data as of July–November 2006.

Source: Korea Employment Information Service, Youth Panel (2006).

To estimate the effect of high school type on employment of non-advancement among high school graduates, the Logit model was applied. The dependent variable is the employment status for the period July–November 2006. The explanatory variables are: age and sex (male = 1) as human attributes; part-time job during high school (experienced = 1), school location (Seoul metropolitan area = 1), and school type (vocational high school = 1) as the school property variable; and, the household's average monthly income (natural log value) and the father's level of education (junior college or higher = 1) as the household background.

Table 11 shows the basic statistics of the variables used for the regression. The total number of high school graduates who did not proceed to junior college or university was 635 persons. Among them, 40.3 percent were male, the average age was 28.1 years, and 32.3 percent had experienced a part-time job during high school. The percentage of schools located in the Seoul metropolitan area was 40.3, and 64.7 percent graduated from a vocational high school. The average household income was 2,584,000 won (14.7 as a log value), and 3.9 percent of the fathers had a junior college or higher academic background.

Table 11. Non-College-Bound High School Graduates: Summary Statistics 1

Variable	Mean	Standard Deviation
Employed or Unemployed (Employed=1)	0.592	0.492
Age	28.128	4.657
Gender (Male=1)	0.403	0.491
Part-Time Job during High School (Experienced=1)	0.323	0.468
Monthly Household Income	2,583,576	1,268,712
Log Monthly Household Income	14.651	0.493
Father's Level of Education (Junior College or Higher=1)	0.039	0.195
Region of High School (Seoul Metropolitan Area=1)	0.403	0.491
Type of High School (Vocational High School=1)	0.647	0.478
Sample	635	

Source: Korea Employment Information Service, Youth Panel (2006).

Table 12 shows the Logit analysis results, and indicates that the employment possibility goes up significantly in terms of statistics when the person is older or a male. When the age increases by 1, the employment possibility increases by 1.07 times. A male's employment possibility is 2.67 times higher than a female's. The experience of a part-time job during high school was also statistically significant in the employment possibility after graduation (1.58 times).

Among household background variables, the father's education does not have a significant influence but household income does. It was found that the higher the household income, the higher the employment possibility for children. Furthermore, the difference in employment possibility by high school type was not statistically significant: Fast entry into the labor market by VHS graduates no longer held true, implying a shift in secondary education.

Table 12. Non-College-Bound High School Graduates: Logit Analysis Estimates of Effect Of High School Type on Employment

Variable	Parameter Estimate	Standard Error	Odds Ratio
Age	0.066	(0.019) ^C	1.069
Gender (Male=1)	0.982	(0.186) ^C	2.670
Part-Time job during High School (Experienced=1)	0.458	(0.193) ^C	1.581
Log Monthly Household Income	1.017	(0.191) ^C	2.766
Father's Level of Education (Junior College or Higher=1)	-0.265	(0.443)	0.767
Region of High School (Seoul Metropolitan Area=1)	-0.014	(0.180)	0.986
Type of High School (Vocational High School=1)	0.200	(0.182)	1.222
Constant	-17.010	(2.881) ^C	
Log Likelihood		-395.876	
LR Chi2(6)		66.86 ^C	
Prob > chi2		0.0000	
Pseudo R2		0.078	
N		635	

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%. Data as of July-November 2006.

Source: Korea Employment Information Service, Youth Panel (2006).

Table 13 shows the wages of two groups. The average monthly wage of the vocational high school

graduate was 1,340,000 won and that of the general high school was 1,480,000 won. Even though the difference is 10 percentage points, it is not statistically significant.

Table 13. Non-College-Bound High School Graduates: Wages by High School Type

	General High School 105 (33.0)		Vocational High School 213 (67.0)		T-Test
	Mean	Standard Deviation	Mean	Standard Deviation	
Monthly Wage	1,480,000	815,226	1,340,000	592,873	1.53 (0.128)
Hourly Wage	7,299	4,928	6,844	4,724	0.80 (0.426)

Source: Korea Employment Information Service, Youth Panel (2006).

The wage function of the employed non-college-bound high school graduate was estimated using two models, with the log value of the hourly wage as the dependent variable in each. The explanatory variables in Model 1 include: age and sex (male = 1) as the human attributes; part-time job during high school (experienced = 1), school location (Seoul metropolitan area = 1), and school type (vocational high school = 1) as the school property variable; and the household's average monthly income (natural log value) and the father's level of education (junior college or higher = 1) as the household background. In addition to the explanatory variables in Model 1, Model 2 includes: the size of the enterprise (more than 300 employees = 1), downward employment status (downward employed = 1),⁵ employed in a specialized field (employed in a specialized field = 1),⁶ permanent job (permanent job = 1), and industry dummy (manufacturing = 1).

Table 14 shows the summary statistics. A total 318 persons were used for the analysis: 45.6 percent were male, the average age was 28.1 years old, and 36.5 percent had experienced a part-time job during high school. The average household monthly income was 2,774,000 won, and 4.4 percent of the fathers had a junior college or higher academic background. Compared with Table 11, the household income level was far higher with an employed – as compared to an unemployed – child.⁷ The proportion of the students who graduated from a school located in the Seoul metropolitan area was 42.1 percent. 67.0 percent graduated from a vocational high school.

On the other hand, large firms (300 employees) hired only 14.5 percent of the graduates, and employment in a specialized field represented less than half of the total employed (44.0 percent). It is

⁵ "Downward employment is the mismatch of employment status and education level, with the latter being higher.

⁶ "Employment in a specialized field" is the match of employment status and education level, either relatively or according to specialized field.

⁷ The educational attainment of the father of the employed child is slightly different from that of the unemployed child. However, this difference is quite insignificant compared to the income level.

also noteworthy that downward employment was not insignificant (18.2 percent): 32.7 percent were employed by the manufacturing industry, and 80.8 percent were permanent employees.

Table 14. Non-College-Bound High School Graduates: Employed Summary Statistics 2

Variable	Mean	Standard Deviation
Monthly Wage	1,384,088	676,204
Hourly Wage	6,994	4,790
Log Hourly Wage	8.717	0.486
Age	28.142	4.337
Gender (Male=1)	0.456	0.499
Part-Time Job during High School (Experienced=1)	0.365	0.482
Monthly Household Income	2,773,671	1,229,263
Log Monthly Household Income	14.736	0.468
Father's Level of Education (Junior College or Higher=1)	0.044	0.205
Region of High School (Seoul Metropolitan area=1)	0.421	0.495
Type of High School (Vocational High School=1)	0.670	0.471
Firm size (300 persons and over=1)	0.145	0.352
Downward Employment	0.182	0.387
Employed in Specialized Field	0.440	0.497
Permanent Employee	0.808	0.394
Industry (Manufacturing=1)	0.327	0.470
Sample	318	

Source: Korea Employment Information Service, Youth Panel (2006).

According to the estimated result of the wage function, the high school type of interest to this analysis does not affect the wage level significantly. Like the ordinary wage function estimate, being older and being a male generates more income, and the household background like the household income positively affects the wage level of the child. Additionally, we can also see that both employment in a large firm and permanent employment have statistical significance in terms of the salary level. The person employed by large firm has a 19.9 percent higher income than that of a small and medium enterprise, whereas the permanent employee has a 27.2 percent higher income than that of the temporary worker. For downward employment, the income level was 18.8 percent lower than for those employed with a job that matches the educational level. However, employment in a specialized field and employment in the manufacturing industry were found not to significantly affect the income level.

Table 15. Non-College-Bound High School Graduates: OLS Estimates of Effect Of High School Type on Wages

	Model 1		Model 2	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Constant	4.578	(0.842) ^C	4.685	(0.806) ^C
Age	0.201	(0.0066) ^C	0.025	(0.0063) ^C
Gender (Male=1)	0.254	(0.055) ^C	0.232	(0.054) ^C
Part-Time Job During High School (Experience=1)	-0.021	(0.055)	-0.047	(0.053)

Log Value of Monthly Household Income	0.233	(0.055) ^C	0.206	(0.053) ^C
Father's Level of Education (Junior College or Higher=1)	0.020	(0.124)	-0.040	(0.119)
Location of High School (Seoul Metropolitan Area=1)	0.017	(0.053)	0.0057	(0.052)
Type of High School (Vocational=1)	0.010	(0.055)	0.023	(0.053)
Size of Enterprise (More than 300 Employees=1)			0.182	(0.074) ^B
Downward Employment			-0.208	(0.066) ^C
Employed in Specialized Field			0.025	(0.051)
Permanent Employee			0.240	(0.064) ^C
Industry Dummy (Manufacturing=1)			-0.022	(0.058)
Adj-R2	0.139		0.221	
N	318		318	

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%.

Source: Korea Employment Information Service, Youth Panel (2006).

In terms of permanent employment, general high school graduates and junior college students are quite similar, or 32.8 percent and 33.1 percent respectively. The χ^2 -test showed no statistically significant difference between the two groups.

Table 16. Non-College-Bound High School Graduates: Ratio of Permanent Employees By High School Type (Unit: Person, Percent)

	Permanent Employee	Non-Permanent Employee	Total
General High School	20 (32.8)	41 (67.2)	61 (19.2)
Vocational High School	85 (33.1)	172 (66.9)	257 (80.8)
Total	105 (33.1)	213 (66.9)	318 (100.00)

Note: The permanent employee ratio difference between the two school types is not significant (χ^2 -test, $p=0.9658$).

Source: Korea Employment Information Service, Youth Panel (2006).

Table 17 shows the Logit analysis results regarding permanent employment: Graduation from a vocational high school does not affect permanent employment significantly in terms of statistics, regardless of the model used. Major factors that affect permanent employment include graduation from a high school located in the Seoul metropolitan area, downward employment, and employment in the manufacturing industry. As a graduate from a high school located in the Seoul metropolitan area, the possibility of finding a permanent job is 2.3 times higher than that of high schools in other locales. In addition, that of downward employment is 44 percent lower than non-downward employment. And, graduates employed in the manufacturing industry are 2.97 times more likely to find permanent employment than those in the non-manufacturing industry.

Table 17. Non-College-Bound High School Graduates: Logit Analysis Estimates of Effect Of High School Type on Permanent Employment

	Model 1			Model 2		
	Parameter Estimate	Standard Error	Odds Ratio	Parameter Estimate	Standard Error	Odds Ratio
Constant	-0.573	(4.730)		-1.652	(4.882)	
Age	-0.030	(0.039)	0.970	-0.021	(0.040)	0.979
Gender (Male=1)	0.408	(0.316)	1.504	0.187	(0.326)	1.206
Part-Time Job during High School (Experienced=1)	0.381	(0.336)	1.464	0.257	(0.349)	1.293
Log Monthly Household Income	0.152	(0.313)	1.164	0.209	(0.324)	1.233
Father's Level of Education (Junior College or Higher=1)	—	—	—	—	—	—
Region of High School (Seoul Metropolitan area=1)	0.820	(0.331) ^C	2.270	0.854	(0.341) ^C	2.350
Type of High School (Vocational High School=1)	-0.039	(0.324)	0.962	-0.050	(0.336)	0.952
Firm size (300 persons and over=1)				-0.210	(0.465)	0.810
Downward employment				-0.815	(0.367) ^C	0.442
Employed in Specialized Field				0.297	(0.836)	1.345
Industry (Manufacturing=1)				1.089	(0.387) ^C	2.971
Log Likelihood	-146.58021			-140.48175		
LR Chi2(6)	11.64 ^A			23.83 ^C		
Prob > chi2	0.0706			0.0081		
Pseudo R2	0.0382			0.0782		
N	304			304		

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%.

Source: Korea Employment Information Service, Youth Panel (2006).

To check the robustness of the analysis results using the Youth Panel, we performed a second analysis using the KEEP data. A major difference between the two panels is that KEEP consists of a specific cohort and the data is less than two years old (i.e., a 2004 graduate can be tracked in 2006). In the analysis, we also assumed that: the general high school (GHS) graduate has better general and intellectual capabilities than the vocational high school (VHS) graduate; and, GHS graduates receive a more limited exposure to VE than the VHS graduate (who receive three years of VE). One possible hypothesis, the VHS graduate would excel in the labor market in the short-term while the GHS graduate would improve and advance faster over time. Yet, neither the percentage of employed nor the salary level and permanent employment⁸ rate differed significantly between the two cohorts. This implies that the labor market achievement of the vocational high school graduate is not significantly different from that of the general high school graduate and that the above hypothesis does not reflect the actual situation.

2.2.2. First Job

According to the Youth Panel 102 analysis targets out of 440⁹ were confirmed with employment

⁸ The analysis result was not presented here due to limited space. However, it can be requested from the author at any time.

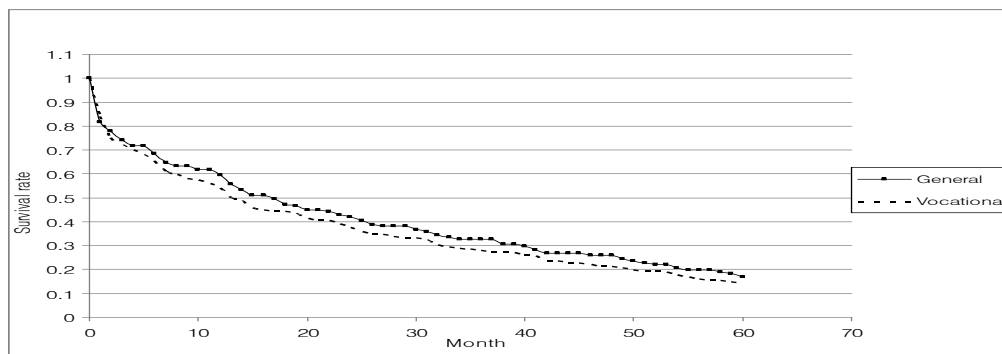
⁹ The analysis excluded the graduates who were employed after 60 months. It is reasonable to regard them as an outlier since they had no employment experience five years after graduation. In the analysis where they were included, no significant

before graduation and 338 graduates were unemployed at the time of graduation. Among the 338, 287 were successful in employment and 51 were unemployed 60 months (the observation period) after graduation – right censored observation value. In this section, the rate of transition to the employment state is analyzed for the 338 graduates who were not employed at the time of graduation.

If the data is censored, a survival function estimate that considers the censored data is needed. We employ the most popular estimate method, the Kaplan-Meier (KM) method, to calculate the survival rate by estimating the survival function for both VHS graduates who did not continue to the university and GHS graduates. In this case, the survival rate means the probability that the graduate in the unemployment state at the time period “t” would be unemployed continuously until the time period “t + dt.” The transition rate is calculated by “1 – survival rate.”

Figure 1 shows the diagram of the resultant survival rate. We can see that the survival rate of the vocational high school graduates (the probability of remaining in the unemployment state after graduation) is consistently lower than that of the general high school graduates. However, the gap seems to be insignificant.

Figure 1. Non-College-Bound High School Graduates: Survival Rates By High School Type (Kaplan-Meier Survival Function)



Source: Korea Employment Information Service, Youth Panel (2006).

Even though the survival function of VHS graduates who did not continue to the university and GHS graduates was estimated and the difference of the survival rate by period was reviewed, the results needed to be tested to determine if they were meaningful. For this, an equality test of the survival function is necessary. The most frequently used test methods include the Log-Rank test and the Wilcoxon Rank test. The former test places emphasis on the data with a long survival period, whereas

differences resulted. Sixty-three individuals were excluded from this analysis because their date of graduation could not be ascertained.

the latter emphasizes the short survival period data.

Table 18 shows the result of the equality test for the survival function using these two methods. Accordingly, the null hypothesis that the two survival functions are the same could not be rejected. Therefore, we can see that, with the passage of time, there is no significant difference in transition from unemployment to employment between VHS graduates who did not continue to the university and GHS graduates.

Table 18. Non-College-Bound High School Graduates: Equality Test of Survival Function by High School Type

	Log-Rank Test		Wilcoxon Rank Test		
	Observed Events	Expected Events	Observed Events	Expected Events	Sum of Ranks
General	109	115.98	109	115.98	-1319
Vocational	178	171.02	178	171.02	1319
Total	287	287.00	287	287.00	0
Chi2(1)	0.75		0.57		
Pr>chi2	0.3860		0.4507		

Source: Korea Employment Information Service, Youth Panel (2006).

The time period required to get a job after graduation is affected by many factors, such as human attributes, household background, school characteristics, and others. In this section, the hazard model is applied to analyze the influence of the high school type after controlling various factors that affect transition from the unemployment state. If the factors affecting the transition are analyzed by applying the hazard model to the right censored data, there is an advantage of securing a consistency of estimates.

In this section, the Cox Proportional Hazards Model is applied. It has the benefit of identifying the effect of the explanatory variables on hazard without estimating the function for the distribution of basic hazard. Depending on the combination of explanatory variables, four estimate models were applied. The explanatory variables of Model 1 include: age and sex dummy (male = 1) as human attributes; part-time job during high school (experienced = 1), school location (Seoul metropolitan area = 1), and school type (vocational high school = 1) as the school property variable; and the log value of the household's average monthly income and the father's level of education dummy (junior college or higher = 1) as the household background. In addition to the explanatory variables of Model 1, Model 2 includes: the size of the enterprise (more than 300 employees = 1), downward employment status (downward employed = 1), employed in a specialized field (employed in a specialized field = 1), permanent job (permanent job = 1), and industry dummy (manufacturing = 1). Models 3 and 4 add the log value of the job's hourly wage as the additional explanatory variable to Model 1 and 2 respectively.

The analysis results show that vocational high school education does not improve the prospect of employment significantly: the estimate coefficient of the vocational high school dummy variables is not significant.

Considering the influence of other variables, the probability of unemployment escape drops significantly in terms of statistics as age goes up. The hourly wage was found to decrease the escape probability significantly, which implies that it takes longer to find a decent job after graduation. The fact that the escape probability goes up with downward employment can be understood in the same context. Those who find a “downward” job have the 1.5 times better escape probability than those who find a job that matches their education. However, it seems contradictory that the escape probability goes up when employed as a permanent employee. As expected, the job seeker who finished military service has the negative (-) estimate coefficient, which proves that military service is the constraint factor in the transition to the first job. On the other hand, the household background and experience of a part-time job during high school were found not to affect the possibility of escaping to employment significantly.

Table 19. Non-College-Bound High School Graduates: Estimate of Effect of High School Type On School-to-Work Transition Period (Cox Proportional Hazards Model)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	Hazard Ratio	Coef.	Hazard Ratio	Coef.	Hazard Ratio	Coef.	Hazard Ratio
Type of High School (Vocational High School=1)	-0.026 (0.125)	0.974	0.030 (0.127)	1.031	0.098 (0.128)	1.103	0.152 (0.129)	1.164
Age	-0.061 (0.016) ^c	0.941	-0.056 (0.016) ^c	0.946	-0.061 (0.017) ^c	0.940	-0.060 (0.017) ^c	0.942
Gender (Male=1)	-0.575 (0.189) ^c	0.563	-0.465 (0.192) ^b	0.628	-0.565 (0.192) ^c	0.568	-0.425 (0.197) ^b	0.654
Part-Time Job during High School (Experienced=1)	-0.107 (0.135)	0.899	-0.100 (0.135)	0.904	-0.084 (0.138)	0.920	-0.089 (0.138)	0.914
Log Monthly Household Income	0.173 (0.127)	1.189	0.171 (0.126)	1.187	0.112 (0.131)	1.119	0.093 (0.129)	1.098
Father's Level of Education (Junior College or Higher=1)	-0.057 (0.314)	0.945	-0.094 (0.314)	0.911	-0.128 (0.318)	0.880	-0.148 (0.318)	0.862
Region of High School (Seoul Metropolitan Area=1)	-0.120 (0.128)	0.887	-0.111 (0.128)	0.895	-0.064 (0.130)	0.938	-0.061 (0.130)	0.941
Military Service (Finished=1)	-0.433 (0.218) ^b	0.648	-0.512 (0.220) ^b	0.599	-0.472 (0.219) ^b	0.624	-0.562 (0.221) ^b	0.570
Log Hourly Wage			-0.374 (0.117) ^c	0.688			-0.420 (0.120) ^c	0.657
Firm Size (300 Persons and Over=1)					0.065 (0.179)	1.067	0.199 (0.183)	1.220
Downward Employment					0.389 (0.145) ^c	1.475	0.399 (0.145) ^c	1.490
Employed in Specialized Field					-0.006 (0.136)	0.994	0.014 (0.138)	1.014
Permanent Employee					0.795 (0.171) ^c	2.215	0.809 (0.170) ^c	2.245
Industry (Manufacturing=1)					-0.985 (0.739)	0.374	-1.050 (0.740)	0.350
Log Likelihood	-1451.6311		-1446.1824		-1436.2598		-1429.5661	
LR Chi2(14)	78.47 ^c		89.36 ^c		109.21 ^c		122.60 ^c	
Prob > Chi2	0.0000		0.0000		0.0000		0.0000	
N	338		338		338		338	

Note: ^a Significant at 10%, ^b Significant at 5%, and ^c Significant at 1%. Standard errors in parentheses.

Source: Korea Employment Information Service, Youth Panel (2006).

In terms of analyzing the transition to the first job, which is not discussed in this paper, the results from the Youth Panel are not significantly different from those of KEEP. In conclusion, the vocational high school graduates did not transit to the first job any faster than the general high school graduates.

2.3. Junior College Graduates

2.3.1 Current Employment Status

According to the Youth Panel, whether a student matriculated from vocational or general high school to junior college was not a determinant of employment upon graduation. The percentage of employment (as of July–November 2006) of the junior college graduates who matriculated from a vocational high school is 62.9 percent, which is not very different from that of the junior high school graduates matriculating from a general high school (62.4 percent). In fact, the former was .05 percentage points more likely to be employed than the latter (62.9 percent for vocational high school graduates and 62.4 percent for general high school graduates).

Table 20. Junior College Graduates: Employment Rates by High School Type
(Unit: Person, Percent)

	Employed	Not employed	Total
General High School	121 (62.37)	73 (37.63)	194 (28.57)
Vocational High School	304 (62.88)	181 (37.32)	485 (71.43)
Total	425 (62.59)	254 (37.41)	679 (100.00)

Note: The employment rate difference between the two school types is not significant (χ^2 -test, $p=0.9400$). Data for the period July–November 2006.

Source: Korea Employment Information Service, Youth Panel (2006).

The Logit model was applied to the previous findings in order to test robustness. That is, when all other factors that can affect employment status are controlled, does high school formation (vocational or general) affect the employment outcome of junior college graduates? The dependent variable is the employment status for the period July–November 2006. The explanatory variables include: age and sex (male = 1) as human attributes; part-time job during junior college (experienced = 1), school location (Seoul metropolitan area = 1), specialized field of study (the humanities, social sciences, engineering, pharmaceutical, education, and arts and athletics departments are set as dummy variables), and high school type (vocational high school = 1) as the school property variables, the household's average monthly income (natural log value), and the father's level of education (junior college or higher = 1) as the household background variables.

Table 21 shows the basic statistics of the variables used for the Logit analysis. The total number of junior college graduates was 679. Among them, 32.8 percent were male, the average age was 27.2 years old, and 62.6 percent had experience in a part-time job while attending school. Looking into specialized

studies, engineering ranked the highest (44.3 percent), followed by the humanities (16.8 percent), arts and athletics (15.3 percent), and social sciences (12.7 percent). The proportion of the vocational high school graduates was 37.4 percent. The average income of the household was 2,912,000 won (14.8 as a log value), and 9.9 percent of the fathers had a junior college or higher academic background.

Table 21. Junior College Graduates: Summary Statistics 3

Variable	Mean	Standard Deviation
Employment or not (employed=1)	0.714	0.452
Gender (Male=1)	0.328	0.470
Age	27.225	3.773
Part-Time Job during High School (Experienced=1)	0.626	0.484
Monthly Household Income	2,912,262	1,417,705
Log Monthly Household Income	14.777	0.471
Father's Level of Education (Junior College or Higher=1)	0.099	0.298
Region of College (Seoul Metropolitan Area=1)	0.334	0.472
Humanities	0.168	0.374
Social Sciences	0.127	0.333
Natural Sciences	0.443	0.497
Medical and Pharmacy	0.084	0.278
Education	0.025	0.156
Arts and Physical Ed.	0.153	0.360
Type of High School (Vocational High School=1)	0.374	0.484
Sample	679	

Source: Korea Employment Information Service, Youth Panel (2006).

When the Logit analysis takes employment status as a dependent variable (Table 22), the possibility of employment rises significantly for young men, and the economic background and income of the household significantly affect positive current employment. In another conspicuous characteristic, the graduates of a school located in the Seoul metropolitan area show higher employment possibilities. The employment possibilities between general and vocational high school graduates, on the other hand, are not significantly different.

Table 22. Junior College Graduates: Logit Analysis Estimates of Effect of High School Type On Employment

Variable	Parameter Estimate	Standard Error	Odds Ratio
Age	-0.077	(0.026) ^C	0.926
Gender(Male=1)	0.817	(0.226) ^C	2.264
Part-Time Job during High School (Experienced=1)	-0.012	(0.188)	0.988
Log Monthly Household Income	0.762	(0.192) ^C	2.142
Father's Level of Education(Junior College or Higher=1)	-0.113	(0.300)	0.893
Region of College(Seoul Metropolitan Area=1)	-0.508	(0.195) ^C	0.602
Type of High School(Vocational High School=1)	-0.187	(0.190)	0.829
Humanities	-0.301	(0.304)	0.740
Social Sciences	-0.150	(0.328)	0.861
Natural Sciences	0.059	(0.276)	1.061
Medical And Pharmacy	0.626	(0.425)	1.871
Education	0.678	(0.635)	1.969
Constant	-8.194	(2.906) ^C	
Log Likelihood	-379.40637		
Lr Chi2(12)	53.64 ^C		
Prob>Chi2	0.0000		
Pseudo R2	0.0660		
N	679		

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%. Data as of July-November 2006. Standard errors in parentheses.

Source: Korea Employment Information Service, Youth Panel (2006).

The wage level of the vocational high school–junior college graduate was 1,310,000 won and was much lower than that of the general high school–junior college graduate (1,490,000 won). The difference is statistically significant.

Table 23. Junior College Graduates: Wages by High School Type

	General High School 273 (62.3)		Vocational High School 165 (37.7)		T-test
	Mean	Standard Deviation	Mean	Standard Deviation	
Monthly Wage	1,490,000	846,691	1,310,000	467,434	2.82 (0.0050) ^C
Hourly Wage	8,003	5,545	6,527	3,207	3.53 (0.0005) ^C

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%.

Source: Korea Employment Information Service, Youth Panel (2006).

As described, the wage function of the employed junior college graduates was estimated using two models with the same dependent variable, the log value of the hourly wage. Model 1 includes the following explanatory variables: age and sex (male = 1) as human attributes; part-time job during high school (experienced = 1), school location (Seoul metropolitan area = 1), high school type (vocational high school = 1), and specialized field of study (humanities, social sciences, engineering, pharmaceutical, education, and arts and athletics departments are set as dummy variables), as the school property variables; and the household's average monthly income (natural log value) and the father's level of

education (junior college or higher = 1) as the household background variables. To the explanatory variables of Model 1, Model 2 adds: the size of the enterprise (more than 300 = 1), downward employment status (downward employed = 1), employed in a specialized field (employed in a specialized field = 1), permanent job (permanent job = 1), and industry dummy (manufacturing = 1).

Table 24 shows the basic statistics. The analysis included a total of 438 persons. Among them, 34.9 percent were male, the average age was 26.8 years old, and 63.9 percent had experience in a part-time job during high school. The average household monthly income was 3,035,000 won, and 9.8 percent of the fathers had a junior college or higher academic background. The proportion of the students who graduated from a school located in the Seoul metropolitan area was 29.2 percent, and 37.7 percent graduated from a vocational high school.

On the other hand, large firms employed a mere 17.1 percent, and slightly more than half (53.0 percent) worked in a specialized field. While the proportion employed in the manufacturing industry was 19.4 percent, permanent jobs represented a relatively high 81.1 percent.

Table 24. Junior College Graduates: Employed Summary Statistics 4

Variable	Mean	Standard Deviation
Monthly Wage	1,419,817	731,853
Hourly Wage	7,447	4,849
Log Hourly Wage	8.797	0.454
Age	26.824	3.699
Gender (Male=1)	0.349	0.477
Experience of Part-Time Job during High School (Experienced=1)	0.639	0.481
Monthly Household Income	3,035,257	1,471,060
Log Monthly Household Income	14.820	0.470
Father's Level of Education (Junior College or Higher=1)	0.098	0.298
Region of College (Seoul Metropolitan Area=1)	0.292	0.455
Humanities	0.135	0.342
Social Sciences	0.121	0.327
Natural Sciences	0.466	0.499
Medical and Pharmacy	0.107	0.310
Education	0.025	0.157
Arts and Physical Ed.	0.146	0.354
Type of High School (Vocational High School=1)	0.377	0.485
Firm Size (300 Persons and Over=1)	0.171	0.377
Downward Employment	0.178	0.383
Employed in Specialized Field	0.530	0.500
Permanent Employee	0.811	0.392
Industry (Manufacturing=1)	0.194	0.396
Sample	438	

Source: Korea Employment Information Service, Youth Panel (2006).

According to the estimate result of the wage function as shown in Table 25, the wage level of the VHS

graduates is lower than that of the GHS by 13 percentage points, which statistically is significantly lower. On the other hand, older men have and households with a better economic background tend to have higher wages. Analyzing the specialized employment, it is statistically significant the graduates of the pharmaceutical department have higher incomes than other departments. The wage level of those employed by large firms is higher and people with downward employment not suited to their education level inevitably suffer from wage loss.

Table 25. Junior College Graduates: OLS Estimates of Effect Of High School Type on Wage

	Model 1		Model 2	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Constant	5.863	(0.658) ^C	6.099	(0.646) ^C
Age	0.023	(0.006) ^C	0.023	(0.006) ^C
Gender (Male=1)	0.140	(0.054) ^C	0.150	(0.053) ^C
Part-Time Job during High School (Experienced=1)	0.075	(0.043) ^A	0.070	(0.043)
Log Monthly Household Income	0.148	(0.044) ^C	0.130	(0.043) ^C
Father's Level of Education (Junior College or Higher=1)	-0.009	(0.069)	-0.056	(0.069)
Region of College (Metropolitan Area=1)	0.028	(0.047)	0.039	(0.046)
High School's Academic Field (Vocational=1)	-0.137	(0.043) ^C	-0.144	(0.043) ^C
Humanities	0.097	(0.077)	0.058	(0.076)
Social Sciences	0.007	(0.079)	-0.017	(0.078)
Natural Sciences	0.092	(0.065)	0.049	(0.065)
Medical and Pharmacy	0.236	(0.083) ^C	0.188	(0.083) ^B
Education	-0.075	(0.139)	-0.077	(0.137)
Firm size (300 persons and over=1)			0.213	(0.055) ^C
downward employment			-0.140	(0.054) ^B
Employed in Specialized Field			-0.055	(0.043)
Permanent Employee			0.083	(0.053)
Industry (Manufacturing=1)			0.006	(0.055)
Adj-R2	0.143		0.181	
N	438		438	

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%. Standard errors in parentheses.

Source: Korea Employment Information Service, Youth Panel (2006).

Permanent employment among the vocational high school–junior college graduates (62.0 percent) was a little lower than among general high school–junior college graduates, although not significant.

**Table 26. Junior College Graduates: Ratio of Permanent Employees by High School Type
(Unit: Person, Percent)**

	Permanent Employee	Non-Permanent Employee	Total
General High School	53 (63.86)	30 (36.14)	83 (18.95)
Vocational High School	220 (61.97)	135 (38.03)	355 (81.05)
Total	273 (62.33)	165 (37.67)	438 (100.00)

Note: The permanent employee ratio difference between the two school types is not significant (χ^2 -test, $p=0.7499$).

Source: Korea Employment Information Service, Youth Panel (2006).

Table 27 shows the Logit analysis results regarding permanent employment. According to the analysis result, graduation from vocational high school does not affect permanent employment significantly in terms of statistics. Nevertheless, a male has 1.7–2.1 times more employment possibilities than a female, and households with a high income have greater employment possibilities. It is also noteworthy that the graduates of the pharmaceutical department have significantly higher incomes than other departments (2.6 times higher). The possibility of finding a permanent job is significantly lower in terms of statistics for the people employed by a large firm or in downward employment. On the contrary, those who were employed in a specialized field or in the manufacturing industry had higher possibilities of finding permanent employment.

Table 27. Junior College Graduates: Logit Analysis Estimates of Effect of High School Type On Permanent Employment

	Model 1			Model 2		
	Parameter Estimate	Standard Error	Odds Ratio	Parameter Estimate	Standard Error	Odds Ratio
Constant	-5.675	(3.997)		-6.924	(4.103) ^A	
Age	-0.011	(0.039)	0.989	-0.004	(0.041)	0.996
Gender (Male=1)	0.737	(0.343) ^B	2.090	0.549	(0.360)	1.731
Part-Time Job during High School (Experienced=1)	-0.217	(0.272)	0.805	-0.246	(0.284)	0.782
Log Monthly Household Income	0.473	(0.267) ^A	1.604	0.551	(0.273) ^B	1.735
Father's Level of Education (Junior College or Higher=1)	0.406	(0.475)	1.501	0.399	(0.501)	1.490
Region of College (Seoul Metropolitan Area=1)	-0.058	(0.287)	0.944	-0.073	(0.308)	0.930
Type of High School (Vocational High School=1)	0.090	(0.268)	1.094	-0.011	(0.286)	0.989
Humanities	0.255	(0.443)	1.290	0.244	(0.464)	1.277
Social Sciences	0.199	(0.452)	1.220	0.155	(0.477)	1.168
Natural Sciences	0.204	(0.368)	1.227	0.049	(0.389)	1.050
Medical and Pharmacy	0.963	(0.536) [*]	2.620	0.750	(0.564)	2.116
Firm size (300 persons and over=1)				-0.845	(0.341) ^B	0.430
Downward employment				-0.868	(0.311) ^C	0.420
Employed in Specialized Field				0.568	(0.285) ^B	1.765
Industry (Manufacturing=1)				1.570	(0.484) ^C	4.809
Log Likelihood	-203.57773			-186.88012		
LR Chi2 (11)	13.45			46.84 ^C		
Prob > chi2	0.2650			0.0000		
Pseudo R2	0.0320			0.1114		
N	427			427		

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%. Standard errors in parentheses.

Source: Korea Employment Information Service, Youth Panel (2006).

2.3.2. First Job

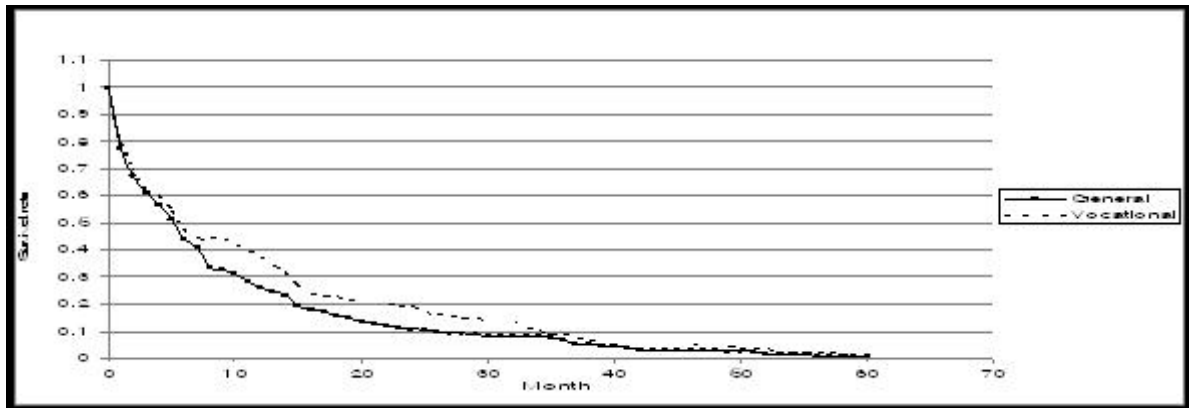
According to the Youth Panel, 97 analysis targets out of 378¹⁰ were confirmed with employment before graduation and 281 graduates were unemployed at the time of graduation. Among the 281, 280 were successful in finding employment and 1 was unemployed in the 60 months (observation period) after graduation – right censored observation value. In this section, the rate of escape to the employment state is analyzed for the 281 graduates who were not employed at the time of graduation.

Figure 2 shows the diagram of the survival rate that is calculated by applying the Kaplan-Meier method. We can see that the survival rate of the VHS graduates (the probability of remaining in the unemployment state after graduation) is consistently higher than for that of the GHS graduates, and the

¹⁰ Like the previous analysis, the graduates who were employed after 60 months were excluded. In addition, 142 persons were excluded from analysis, since their graduation time could not be specified.

gap seems to be relatively large. However, according to the test results of the survival function's equality test, the null hypothesis that the two survival functions are the same could not be rejected (see Table 28).

**Figure 2. Junior College Graduates: Survival Rates by High School Type
(Kaplan-Meier Survival Function)**



Source: Korea Employment Information Service, Youth Panel (2006).

Table 28. Junior College Graduates: Equality Test of Survival Function by High School Type

	Log-Rank Test		Wilcoxon Rank Test		
	Observed Events	Expected Events	Observed Events	Expected Events	Sum of Ranks
General	192	182.33	192	182.33	1367
Vocational	88	97.67	88	97.67	-1367
Total	280	280.00	280	280.00	
chi2(1)	1.67		1.17		
Pr>chi2	0.1967		0.2794		

Source: Korea Employment Information Service, Youth Panel (2006).

Table 29 shows the analysis result of applying the Cox Proportional Hazards Model. Depending on the combination of the explanatory variables, four estimate models were applied. The explanatory variables of Model 1 include: age and sex dummy (male = 1) as human attributes; part-time job during high school (experienced = 1), school location (Seoul metropolitan area = 1), high school type (vocational high school = 1), and specialized field of study (humanities, social sciences, engineering, pharmaceutical, and education are set as a dummy variable, based on arts and athletics as well as other departments) as the school property variable; log value of the average household monthly income and the father's level of education dummy (junior college or higher = 1) as the household background. In addition the explanatory variables of Model 1, Model 2 includes: the size of the enterprise (more than 300 = 1), downward employment status (downward employed = 1), employed in a specialized field (employed in a specialized field = 1), permanent job (permanent job = 1), and industry dummy (manufacturing = 1).

Models 3 and 4 add the log value of the hourly wage as the additional explanatory variable to Model 1 and 2 respectively.

We can see that VHS education does not affect the possibility of escaping unemployment significantly, even though other factors are controlled, because the estimate coefficient of the VHS dummy variables are not significant for the most part.

On the other hand, the probability of unemployment escape drops significantly in terms of statistics, as age increases. Looking into the specialties, the education department graduates have a higher possibility of escaping from unemployment than the other departments. The hourly wage was found to decrease the escape probability significantly, which implies that it takes longer to find a decent job after graduation. Nevertheless, it is a surprise that the escape probability increases with permanent employment and/or a specialized field. As expected, the job seeker who finished military service has a negative (-) estimate coefficient, even though it was not significant. On other hand, if the father's academic background is strong, the possibility of escaping to employment is significant in terms of statistics. However, the experience of a part-time job during high school did not significantly affect the possibility of escaping to employment.

Table 29. Junior College Graduates: Estimate of Effect of High School Type on School-to-Work Transition Period (Cox Proportional Hazards Model)

	Model 1		Model 2		Model 3		Model 4	
	Coef	Hazard Ratio	Coef	Hazard Ratio	Coef	Hazard Ratio	Coef.	Hazard Ratio
Type of High School (Vocational High School=1)	-0.198 (.136)	0.820	-0.238 (0.138) ^A	0.788	-0.127 (0.138)	0.880	-0.166 (0.140)	0.847
Age	-0.052 (0.018) ^C	0.950	-0.060 (0.019) ^C	0.942	-0.061 (0.019) ^C	0.940	-0.069 (0.019) ^C	0.933
Gender (Male=1)	-0.395 (0.250)	0.674	-0.326 (0.251)	0.722	-0.489 (0.266) ^A	0.613	-0.415 (0.266)	0.660
Part-Time Job during High School (Experienced=1)	0.167 (0.133)	1.182	0.158 (0.132)	1.172	0.167 (0.138)	1.182	0.155 (0.138)	1.167
Log Monthly Household Income	0.075 (0.138)	1.078	0.083 (0.138)	1.087	0.091 (0.140)	1.096	0.100 (0.140)	1.105
Father's Level of Education (Junior College or Higher=1)	0.483 (0.216) ^C	1.620	0.490 (0.216) ^B	1.632	0.509 (0.218) ^B	1.663	0.511 (0.218) ^B	1.667
Region of College (Seoul Metropolitan Area=1)	-0.0073 (0.141)	0.993	-0.0096 (0.141)	0.990	-0.044 (0.143)	0.957	-0.033 (0.143)	0.968
Humanities	0.081 (0.219)	1.084	0.157 (0.221)	1.170	0.104 (0.220)	1.109	0.176 (0.222)	1.193
Social Sciences	0.0033 (0.248)	1.0033	0.046 (0.248)	1.047	-0.0039 (0.253)	0.996	0.056 (0.253)	1.057
Natural Sciences	-0.025 (0.201)	0.975	0.022 (0.202)	1.023	-0.0081 (0.205)	0.992	0.049 (0.205)	1.050
Medical And Pharmacy	0.338 (0.245)	1.402	0.373 (0.246)	1.451	0.285 (0.248)	1.330	0.310 (0.248)	1.364
Education	1.111 (0.461) ^C	3.038	1.022 (0.461) ^B	2.780	1.016 (0.464) ^B	2.761	0.919 (0.465) ^B	2.507
Finished Military Service	-0.180 (0.264)	0.835	-0.213 (0.265)	0.808	-0.135 (0.277)	0.873	-0.167 (0.277)	0.846
Log Hourly Income			-0.277 (0.116) ^B	0.758			-0.279 (0.117) ^B	0.756
Firm Size (300 Persons and Over=1)					0.191 (0.201)	1.211	0.251 (0.202)	1.285
Downward Employment					0.220 (0.146)	1.246	0.169 (0.148)	1.185
Employed in Specialized Field					0.300 (0.141) ^B	1.350	0.295 (0.141) ^B	1.343
Permanent Employee					0.293 (0.153) ^A	1.340	0.288 (0.153) ^A	1.334
Industry (Manufacturing=1)					0.226 (0.752)	1.254	0.265 (0.752)	1.304
Log Likelihood	-1296.4757		-1293.5319		-1291.5755		-1288.6397	
LR Chi2(14)	54.28 ^C		60.17 ^C		64.08 ^C		69.96 ^C	
Prob > Chi2	0.0000		0.0000		0.0000		0.0000	
N	281		281		281		281	

Note: ^A Significant at 10%, ^B Significant at 5%, and ^C Significant at 1%. Standard errors in parentheses.

Source: Korea Employment Information Service, Youth Panel (2006).

2.4. Summary

According to the analysis results to this point, current vocational high school education does not seem to obtain any excellent results from the point of view of both the qualitative and quantitative index of labor market transitions, such as the employment percentage at the current point in time, wage levels, permanent employment, and facilitating the transition to the first job, when compared to general high school education.

However, these results should not be misinterpreted to mean that educational performance of vocational high school does not seem to exist or the education system that links the vocational high school with the junior college does not seem to generate excellent results under the current situation.

It needs to be noted that the analysis results have certain limitations in that the characteristics of the general high school graduates who did not proceed to university can be different from those of the vocational high school graduates. Most middle school graduates desire to enter a general high school and most students going to vocational high schools attend the school reluctantly because of their school record. In other words, the academic achievement of the vocational high school student is less than that of the general high school student. If we take scholastic achievement as an important variable that shows the individual's capability, it may be unreasonable to take the general high school students who did not proceed to university as the comparison group of the vocational high school graduates who did not proceed to higher education¹¹. There is a possibility that educational achievement of the vocational high school could be underestimated in that the analysis was conducted without removing the problem of the selection bias, which can be pointed out as the main limitation of this paper. That vocational high school graduates who received a vocational education for three years do not outperform general high school graduates who did not receive enough vocational education in labor market, of course, might lend to results denying the usefulness of upper-secondary vocational education. However, if the ability gap between the two groups is too wide to be made narrow by a concentrated three-year vocational education, the usefulness of vocational education at the upper-secondary stage cannot still be denied. Somehow, a definite conclusion on this matter could not be drawn out only by this study.

In addition, usefulness of past VET system in Korea could not be entirely denied by the analysis results of

¹¹ If the information on the scholastic achievement at the middle school stage was available, the problem of the characteristic difference could be reduced at the time of regression analysis, by controlling the scholastic achievement as an explanatory variable. Unfortunately, the related information was not available.

this study. While precise analysis could not be done as a shortage of data, it is generally accepted that vocational high school education had performed well at least until the 1980s. In the 1970s, vocational high schools had to increase their enrollments as demand exceeded supply for vocational high school graduates, which means that social need for vocational high school education was high. Entrance competition ratio to vocational high school had been remained as about 1.5-to-1 until the 1980s, while it is difficult for vocational high schools to fill their enrollments since 2000, which means also that vocational high school graduates had a bright career path outlook in the past.

III. LABOR MARKET PERFORMANCE OF POST-SECONDARY, PRE-EMPLOYMENT VET

This section analyzes the labor market performance of the graduates from three streams of education: (i) the junior college, (ii) the Korean polytechnic college (KoPo), and (iii) the Human Resource Development Institutes (HRDI) of the Korean Chamber of Commerce and Industry (KCCI). To delineate the role of each stream in the supply of labor to the market, the respective graduates are correlated to labor market outcomes.

3.1. Data

Two sources of data were used in the analysis: a list of the February 2001 graduates of vocational education institutes and the employment insurance database. The former is comprised of three separate sets of data. The KoPos and HRDI (of KCCI) supplied complete data sets, whereas only 23 out of 158 junior colleges supplied such data. For our analysis, the criteria were further refined to those under the age of 30 at the time of graduation. The latter is single-source data; it provided administrative statistics generated by the employment insurance system, including the hiring date, leave/exit date, occupational category, monthly salary (when hired), work hours per week, type of departure, industry, and total number of permanent employees. The combined sources produced novel statistics. These data sources will be here on referred to as employment insurance (EI) data of post-secondary graduates.

We were able to generate the rate of employment of the graduates (strictly speaking, for employment in businesses that subscribed to EI), the period of transition to the first job after graduation, and the tenure of the first job.¹² It should be noted, however, that the nature of the unemployment system imposes explicit limitations on the analysis. For example, the system does not require public servants¹³ and the self-employed to subscribe while many businesses that are required to subscribe simply do not. As shown in Table 30, employment insurance coverage for the wage earner at the end of 2005 was 52.8 percent – mostly attributable to small businesses hiring less than five persons.¹⁴

¹² No data is available that enables us to analyze the labor market achievement of KoPos and KCCI graduates apart from the data that we constructed using the UI database.

¹³ The exclusion of public servants is not decisive because few VET graduates, with the exception of junior college graduates, become public servants (teachers), and becoming public servants (teachers) does not match the purpose of VET.

¹⁴ From this, we can regard jobs in businesses that subscribe to UI as “decent employment.”

Table 30. Employment Insurance Coverage

	Wage and Salary Workers (Thousands)	Insured (Persons)	Percentage
2001	13,625	6,909	49.5
2002	14,405	7,171	49.8
2003	14,624	7,203	49.3
2004	15,109	7,577	50.1
2005	15,273	8,064	52.8

Note: As of the end of December.

Source: Ministry of Labor, Yearly Statistics of Employment Insurance, each year.

Table 31 shows the distribution of gender and age of the sample graduate from each vocational education institute. Analyzing the gender distribution, the proportion of female graduates was: junior college 55.5 percent (highest); KoPo technician training program 21.8 percent; and KoPo craftsmen training program and KCCI regular course (two-year course) around 10 percent. Overall, the proportion of female graduates is small.

When the data is analyzed by age, distinct cohorts can be correlated to programs. The one-year craftsmen training program has the youngest graduates in part because there are no academic prerequisites for admission. The age distribution of graduates of the two-year technician training program and the two-year junior college course are similar. And, among all vocational education institutions, the KCCI two-year course has the largest cohort of older students that is, in their late 20s.

Table 31. Summary: Statistics of Sample

		KoPo		KCCI Two-Year Course	Junior College
		Craftsmen Training Program (1 Year)	Technician Training Program (2 Years)		
Population (Persons)		7,074	5,039	1,956	232,972
Sample (Persons)		5,542	4,073	1,546	38,220
Gender (%)	Male	0.880	0.782	0.908	0.445
	Female	0.120	0.218	0.092	0.555
Age (Years)	Average	20.4	22.7	22.9	23.1
	19-24	0.893	0.694	0.653	0.729
	25-29	0.107	0.306	0.347	0.271

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006.

3.2. Employment

Table 32 shows the employment rate of the students who graduated in February 2001 as of June 2001. Looking at the graduates of the craftsmen training program (one-year course), 20.3 percent was found to have been employed as of June 2001. However, this is lower than that published by the Ministry of Labor (57.6 percent) by 37 percentage points. We can interpret the difference as the proportion of people employed by businesses that did not subscribe to EI.

After all, almost two-thirds of the craftsmen training program graduates are employed but only one-third are employed by businesses that subscribe to EI. Analyzing the subsequent employment percentage trend, it increases slowly and by June 2006 (five years and four months after graduation) only 37.5 percent were employed by EI-subscribed businesses.

Next, 60.9 percent of the graduates of the KCCI two-year course were employed as of June 2001, which is relatively higher than those of other vocational education institutes. Since the KCCI stated the employment of its 2001 graduates as 84.4 percent, we can assume that 23.5 percent found jobs in businesses that do not subscribe to EI. Summarizing all the facts, 84 percent of the KCCI two-year course graduates are employed, and 72 percent of them found a job in businesses subscribing to EI. This shows that the employment rate as well as the quality of employment is good.

The employment percentage of the technician training program graduates is 34.5 percent, which is lower than that of the KCCI two-year course. The Ministry of Labor announced their employment rate as 61.5 percent, which means the 27 percent among them are employed by non-insured businesses. After all, 62 percent of the graduates are employed, and 56 percent of the employed are working for businesses subscribing for EI.

The employment rate of the junior college graduates was 29.1 percent, which was lower than that of the other two educational institutions. This figure too is quite different from the employment rate published by the Ministry of Education, Science and Technology, 81.0 percent. It implies that junior college graduates have the largest percentage of employment but that two-thirds are employed by the non-insured businesses and therefore, their quality of employment is not commensurate with their education.

On the other hand, when the subsequent employment rates are analyzed, that of the KCCI two-year course graduates maintains a similar level without fluctuation while those of the technician training program and the junior college graduates continue to increase. We can see that the gap narrowed to a

larger extent in June 2006 when the percentage of employment was 61.8 percent for the KCCI two-year course, 57.9 percent for the technician training program, and 50.6 percent for the junior college.

Table 32. VET Institutes: Employment Rate under Employment Insurance

	Craftsmen Training Program	Technician Training Program	Two-Year Course at KCCI	Junior College
	Number of Graduates			
	5,542	4,073	1,546	38,220
	Employment Rates			
2001.4	0.200	0.330	0.609	0.248
2001.6	0.203	0.345	0.609	0.291
2002.6	0.229	0.393	0.592	0.417
2003.6	0.256	0.425	0.600	0.465
2004.6	0.279	0.521	0.565	0.488
2005.6	0.311	0.549	0.587	0.501
2006.6	0.375	0.579	0.618	0.506

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006.

Table 33. VET Institutes: Employment Rates of All Graduates by Year (1998-2003)

	Craftsmen Training Program	Technician Training Programs	Two-Year Course at KCCI	Junior College
1998	71.7	79.4	88.4	66.3
1999	52.9	69.0	89.0	68.1
2000	61.1	54.7	80.1	79.4
2001	57.6	61.5	84.4	81.0
2002	60.9	64.9	87.7	80.7
2003	54.4	64.5	86.0	79.7

Note: Employment rate is the proportion of the employed to all the graduates.

Source: Ministry of Education, Science, and Technology, Statistical Yearbook of Education, each year; Ministry of Labor, Review of Vocational Ability Development (2003); Korea polytechnic colleges foundation internal document (2007); Korea Chamber of Commerce and Industry, Human Resources Development Office internal document (2003).

Taking all of the analysis results described above, the two-year course exhibits better employment achievement than the one-year course. Among two-year courses, the KCCI two-year course shows excellent employment achievement, with the highest rates of employment as well as the largest proportion hired by EI-subscribed businesses.

Table 34. VET Institutes: Employment Rates of Graduates by Level of Study (2001)

	Craftsmen Training Program	Technician Training Programs	KCCI Two-Year Course	Junior College
Employment Rates A ¹	57.6	61.5	84.4	81.0
Employment Rates B ²	20.3	34.5	60.9	29.1
A-B	37.3	27.0	23.5	51.9
B/A	35.2	56.1	72.2	35.9

Note: ¹Employment Rates A is from Table 33. ²Employment Rates B is from Table 32 as of June 2001.

Source: Combined sources of Table 31 and 33.

3.3. First Job

In this section, the quality of employment is reviewed by analyzing the first job taken by the graduates from each vocational education institute. It details the transition period to the first job, the working conditions of the job (e.g., occupation, business size, and wages upon employment), and tenure of the employment.

In order to be included in employment before graduation, employment after November 2000 was regarded as the first job, while those leaving to take a job before February 2001 (at the time of graduation) were excluded.

3.3.1 *Transition Period to the First Job*

The transition period of the graduate to the first job is defined as the period of time from graduation (February 1, 2001) to the first employment date. However, if the graduate is employed before graduation, the transition period is set to 0 (months) for analysis. The transition to the first job was analyzed based on the employment experience until June 1, 2007 – the standard point of time.

First, the proportion of the graduates who had no employment experiences (in EI-subscribed businesses) by the standard point in time was 5.2 percent for the KCCI two-year course and 13.4 percent for the technician training program. Those for the junior college and the craftsmen training program were 19.6 percent and 20.6 percent respectively, which means that one-fifth of all graduates from the junior college and the craftsmen program had no employment experience.

Analyzing the transition period to the first job of the graduates having had employment experience, the KCCI two-year course is the shortest of all (7.2 months), compared with 14.8, 16.4, and 23.3 months from the junior college, the technician training program, and the craftsmen training program, respectively. It implies that the one-year course graduates have more difficulty in making the transition to their first job, compared with the two-year courses. On the other hand, according to Economically Active Population Survey by the Korea National Statistical Office, the average transition period to the first job for youths (15–29 years old) was 11 months in 2002 and 12 months in 2003.

Let us now examine the distribution of the transition period to the first job (see Table 35). Firstly, 31.4 percent (about one-third) of the craftsmen training program graduates experienced their first job within six months after graduation. On the other hand, 25.7 percent of the graduates took more than three

years to transition to the first job, which is a high level.¹⁵

Analyzing the two-year courses, 71.7 percent of the KCCI two-year course graduates experienced their first job within three months of graduation, and three-quarters of all graduates got their first job within six months. So we can conclude that the KCCI two-year course graduates have the highest employment rate and the shortest transition period. The proportion of getting a job within six months for the technician training program and the junior college graduate, however, were 45.7 and 37.1 percent respectively, which shows a relatively slow transition.

Table 35. First Job: Transition Period

	Total Graduates	Not Employed	0-3 Months	3-6 Months	6-12 Months	1-1.5 Years	1.5-2 Years	2-3 Years	3-3+ Years	Average Transition Period of Employed
Craftsmen Training Program	5,542	1,140	1508	235	359	309	245	324	1422	23.3
		0.206	0.272	0.042	0.065	0.056	0.044	0.058	0.257	
Technician Training Program	4,073	547	1,630	231	228	177	123	406	731	16.4
		0.134	0.400	0.057	0.056	0.043	0.030	0.100	0.179	
KCCI Two-Year Course	1,546	82	1108	71	39	29	25	67	125	7.2
		0.053	0.717	0.046	0.025	0.019	0.016	0.043	0.081	
Junior College	38,220	7,480	11,065	3,079	3,903	3,601	1,914	2,869	4,309	14.8
		0.196	0.290	0.081	0.102	0.094	0.050	0.075	0.113	

Source: Combined sources of table 31 and 33.

Hereafter we are going to analyze the jobs taken within two years after graduation (that is, before March 2003) because it is possible that other experiences like additional schooling, military service, and job experiences for a non-EI company affect the transition to the first job if the transition period is longer than two years.¹⁶ Insufficient data both preclude controlling for such effects and curtail the study to two years in order to determine how training in the vocational education institute affects employment.

Table 36 shows the proportion of first job employment within two years, and the average transition period. As described above, the KCCI two-year course has the largest percentage of employment and the shortest average transition period (1.5 months). In the case of the junior college, the percentage of employment within two years is not less than others but the average transition period is longer, 6.6 months. Likewise, the proportion of graduates from the craftsmen training program is relatively small with a long average transition period, implying a less than optimal transition to the first job.

¹⁵ Of note, and as discussed, these percentages do not include the experience of graduates who worked for non-EI companies.

¹⁶ Among the graduates of February 2001, the proportion of those that proceeded to universities or who entered military service was 40.5, 38.5, and 15.6 percent for the craftsmen program, technician program, and KCCI two-year course, respectively. Of the junior college graduates, 7.1 percent continued to universities.

The percentage of employment within two years for the graduates of the craftsmen training program is two times more than the employment rate in June 2003, which is larger than other two-year vocational education institutions (1.3-1.4 times). It can be inferred that the tenure of the first job taken by craftsmen training program graduates is short.

Table 36. First Job: Two-Year Transition

	Craftsmen Training Program	Technician Training Programs	Two-Year Course at KCCI	Junior College
Percentage	0.485	0.590	0.825	0.624
Number of Graduates	2,690	2,404	1,275	23,842
Average Transition Period (Months)	5.8	3.9	1.5	6.6

Note: "First job within two years" indicates the first job of a VE graduate before March 1, 2003.

Source: Combined sources of table 31 and 33.

3.3.2 *Quality of the First Job: Occupation, Size, and Wage upon Employment*

Occupation

Table 37 presents the occupation distribution of the first job within two years and the total labor force of businesses hiring more than five employees in 2001. When the graduates of the VE streams are compared to at-large youth (under age 29), the VE educational experience is reflected disproportionately in two occupations, craft and trades-related workers and elementary occupations. This demonstrates that the VE institutions supply production technicians to the labor market. The KCCI two-year course and the technician training program, in particular, produce higher proportions of technicians and associate professionals than the average for youth, meaning that they cultivate more skilled workers than the craftsmen training program. Among all graduates, the largest proportion of clerks is trained by the technician training program and the junior colleges.

Table 37. First Job: Occupation

Occupation	Craftsmen Training Program	Technician Training Program	KCCI Two- Year Course	Junior College	Enterprises with 5 Persons and Over (2001)	
					29 Years Old and Less	Total
Senior Officials and Managers	0.002	0.003	0.000	0.004	0.002	0.049
Professionals	0.006	0.029	0.013	0.072	0.105	0.110
Technicians and Associate Professionals	0.089	0.158	0.142	0.167	0.136	0.157
Clerks	0.072	0.290	0.152	0.433	0.404	0.244
Service Workers and Shop and Market Sales Workers	0.049	0.057	0.022	0.128	0.072	0.052
Skilled Agricultural and Fishery Workers	0.001	0.000	0.000	0.000	0.001	0.002
Craft and Trades-Related Workers	0.398	0.275	0.397	0.107	0.083	0.107
Plant, Machine Operators, and Assemblers	0.094	0.048	0.090	0.014	0.177	0.218
Elementary Occupations	0.289	0.141	0.185	0.075	0.020	0.060
Total	2,686	2,404	1,273	23,842		

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006; Ministry of Labor, Survey Report on Wage Structure (2001).

Size of Enterprise

Tables 38 and 39 reflect the distribution of employees by business size and the proportion of the insured that participate in the Employment insurance (EI) system, respectively. Among all workers, 77.6 are employed by companies with less than 100 employees and 58.1 percent are insured by the EI. This means that subscription to EI is poor among small businesses (i.e., those employing less than 100 persons), and that the rate of subscription to EI increases with the size of the business.¹⁷

Table 38. Size of Enterprise: Number of Workers

Enterprise Size (Persons)	2001		2002		2003	
1-19	7,813,592	0.554	8,165,249	0.559	8,227,826	0.559
20-99	3,129,808	0.222	3,240,374	0.222	3,292,851	0.224
100-299	1,428,262	0.101	1,417,803	0.097	1,412,475	0.096
300-499	496,559	0.035	512,927	0.035	512,935	0.035
500	1,241,420	0.088	1,271,969	0.087	1,283,079	0.087
Total	14,109,641	1.000	14,608,322	1.000	14,729,166	1.000

Source: Korea National Statistical Office, Census on Basic Characteristics of Enterprises, each year.

¹⁷ Comparing the number of the insured and the number of persons working for a business hiring more than 500 persons (Tables 40 and 41), the number of the insured is larger than the total workers. This result reflects the fact that some small-size branch offices are included in the large-scale headquarters among businesses subscribing to UI.

Table 39. Size of Enterprise: Number of Insured

Enterprise Size (Persons)	2001		2002	
	Number of Insured	(%)	Number of Insured	(%)
1-29	2,908,387	42.1	3,065,153	42.7
30-99	1,105,230	16.0	1,177,615	16.4
100-299	995,676	14.4	1,047,700	14.6
300-499	351,100	5.1	345,629	4.8
500	1,548,495	22.4	1,535,117	21.4
Total	6,908,888	100.0	7,171,214	100.0

Source: Korea Employment Information Service, Yearly Statistics of Employment Insurance (2002).

Table 40 shows the size of the business in which graduates of each vocational education institute were employed. In terms of the first job, the percentage of employment with businesses hiring less than 100 persons is larger than that of the insurer of EI described above.

First, the proportions of the businesses hiring 30–99 persons of the craftsmen training program and the KCCI two-year course graduates are two times larger than that of all insured. The proportion of the junior college graduates who were employed by businesses hiring less than 30 persons was almost 50 percent. For the technician training program, 43.2 percent and 27.6 percent were employed by businesses hiring less than 30 persons and 30–99 persons respectively, which are greater than that of all insured. The proportion of the junior college graduates working for businesses hiring more than 500 persons is 14.4 percent, which is comparatively larger than other vocational education institutions.

Table 40. Size of Enterprise: First Job

Enterprise Size (Persons)	Craftsmen Training Program	Technician Training Programs	Two-Year Course at KCCI	Junior College
1-29	0.365	0.432	0.423	0.516
30-99	0.312	0.276	0.354	0.168
100-299	0.193	0.158	0.134	0.131
300-499	0.043	0.040	0.038	0.041
500	0.088	0.094	0.051	0.144
Total	2,661	2,356	1,267	23,446

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006.

Wages

Table 41 shows the real wage level of the first job¹⁸ by the vocational education institute. One thing to note is that the EI database provides the wage information at the time of employment only; therefore wage increases by continuous service are not reflected at all. This results in an overall low wage

¹⁸ Wages were converted into real wages by applying the consumer price index (100 in 2005). The CPI was 84.9, 88.3, 90.8, and 93.9 in 2000, 2001, 2002, and 2003 respectively.

level.¹⁹

When setting the wage level of the craftsmen training program to 100, the relative wage of the KCCI two-year course was 103.5, that of the technician training program was 110.0, and the junior college was 112.1, which shows that the two-year course graduates have higher wages than those from the one-year course. By gender and age, older men tend to earn higher wages.

One noteworthy point is that first job wages of the KCCI two-year course graduates, which have relatively better employment outcomes, are lower than those of the technician training program and junior college graduates. This can be inferred to mean that the KCCI two-year course graduates obtained jobs easily but their working conditions were not very favorable.

Table 41. First Job: Real Wages (Won)

	Craftsmen Training Program	Technician Training Programs	KCCI Two-Year Course	Junior College
Total	864,673	950,977	894,889	969,555
Relative Wage	100.0	110.0	103.5	112.1
Male	870,605	974,040	895,085	1,030,000
Female	822,408	889,218	893,099	919,166
19~24 Years	839,514	875,525	811,166	934,439
25~29 Years	993,163	1,070,000	1,020,000	1,080,000

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006.

3.3.3 Tenure and Separation of the First Job

The tenure of the first job was calculated from employment to the point in time of leaving the company. If the worker continued working in his/her first job as of June 1, 2007, tenure was calculated from employment to the current point in time. None of KCCI two-year course graduates maintained their job at this point in time, while 11.3 percent and 9.7 percent of the junior college and the technician training program graduates maintained their first jobs. Therefore, the average tenures of these two groups are shown to be below real tenure.

¹⁹ Nominal wages and real wages of the youth in businesses hiring more than five persons are shown in the table.

Age	2001		2002		2003	
	Nominal Wage	Real Wage	Nominal Wage	Real Wage	Nominal Wage	Real Wage
19	791,760	896,670	874,488	963,093	902,720	961,363
20-24	877,445	993,709	978,317	1,077,442	1,046,881	1,114,889
25-29	1,129,796	1,279,497	1,263,305	1,391,305	1,345,451	1,432,855

Source: Ministry of Labor, Survey Report on Wage Structure, 2001-2003.

Note: (1) Establishments with five persons and over; (2) Real wage was calculated using the CPI (100 in 2005) and 84.9, 88.3, 90.8, and 93.9 in 2000, 2001, 2002, and 2003 respectively; (3) Unit: Won.

The average tenure of the first job of the craftsmen training program graduates was 15.6 months, whereas those of the two-year course graduates were longer – 23.3 months for the KCCI two-year course, 21.6 months for the technician training program, and 21.3 months for the junior college.²⁰

If the distribution of tenure is reviewed, 47.9 percent of the craftsmen training program graduates left their first job within six months and 62.7 percent left the job within one year. In other words, among the graduates who got a job within two years after graduation, half leave the job within six months and two-thirds leave the job within one year, showing that settlement in the first job is quite rare.

Among the KCCI two-year course, the technician training program, and the junior college graduates, 30–35 percent left the first job within six months and 44–51 percent left the job within one year. Even though the tenure is longer than that of craftsmen training program graduates, one-third left the job within six months and almost half left the job after one year, which reflects the transient nature of work as well as the inclination of youth to change jobs accordingly.

Table 42. First Job: Distribution of Tenure (Unit: Months, Person)

	Total	Average tenure	0-3 Months	3-6 Months	6-12 Months	1-1.5 Years	1-2 Years	2-3 Years	3 or More Years
Craftsmen Training Program	2,690 (121)	15.6 [19.45]	830 0.309	456 0.170	400 0.149	250 0.093	130 0.048	206 0.077	418 0.155
Technician Training Programs	2,404 (232)	21.6 [22.76]	427 0.178	422 0.176	370 0.154	244 0.101	145 0.060	194 0.081	602 0.250
Two-Year Course at KCCI	1,275 (0)	23.3 [22.48]	231 0.181	179 0.140	153 0.120	152 0.119	55 0.043	127 0.100	378 0.296
Junior College	23,842 (2,698)	21.3 [22.41]	3,826 0.160	3,513 0.147	4,442 0.186	3,168 0.133	1,719 0.072	2,138 0.090	5,036 0.211

Note: () means the number of those who worked at their first jobs as of June 1, 2007, and [] means standard deviation.

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006.

Analyzing the reason for separation in Table 43, more than 80 percent quit the job voluntarily. There are some variations among the vocational education institutions: The craftsmen training program and the KCCI two-year course have a larger proportion of voluntary job separation than do the technician training program and junior college.

²⁰ According to Economically Active Population Survey by the Korea National Statistical Office, the average tenure of a youth's first job was 23 months in 2002 and 21 months in 2004 and 2005.

Table 43. First Job: Reasons for Separation

Reasons for Separation	Craftsmen Training Program	Technician Training Programs	Two-Year Course at KCCI	Junior College
Voluntary	0.886	0.840	0.869	0.803
Involuntary (Company's Circumstances)	0.080	0.133	0.104	0.152
Involuntary (Disciplinary Dismissal, Retirement)	0.033	0.027	0.027	0.041
Etc.	0.001	0.000	0.001	0.004
Total	2,568	2,146	1,187	20,963

Source: Ministry of Labor and post-secondary VET institutions, employment insurance data of 2001 post-secondary VET graduates, 2001-2006.

3.4. Summary of Analysis Results

Table 44 shows the summary of the analysis of labor market performance of vocational education graduates. First, the labor market achievement of the one-year craftsmen training program graduates from KoPos in comparison to those of the other vocational education institutes was relatively poor:²¹ lower employment rate, longer transition period to the first job, higher proportion of craft and trades-related workers and elementary occupations at small and medium enterprises (SMEs), and low wages. As a result, the tenure of craftsmen program graduates was short and many of them left their first job voluntarily.

Even though KoPo technician training program and the KCCI two-year course have better labor market outcomes than the craftsmen training program, each institution shows differing characteristics. The graduates of the KCCI two-year course have the highest percentage of employment and employment by businesses subscribing to EI; and their average transition period to the first job is very short. Their occupations in first jobs were predominately craft and trades-related work or elementary occupations at SMEs, yet their proportion of the technicians and associate professionals was also large. And, even though their average wage level was not high their average tenure was long.

The labor market achievements of the technician training program graduates to some extent lag behind those of the KCCI two-year course graduates. The employment rate of its graduates is low and the transition period to the first job is long. By the program, the KoPos provided technicians and associate professionals as well as craft and trades-related workers or elementary occupations at SMEs. Their wages are higher than those of graduates of other vocational education institutions, and their tenures are also

²¹ This result also can be explained from the difference of the human resource attribute (in particular, academic background) of the craftsmen training program graduates. As pointed out, the craftsmen training program requires no academic credentials and targets non-college-bound youth, the unemployed, and women. On the other hand, the prerequisite for the two-year courses are a high school diploma, the equivalence of a high school diploma, or higher education.

long.

The analysis results demonstrate that the vocational education institutes play an important role in supplying technical production labor to small and medium enterprises (SMEs). With the rise in popularity of tertiary studies in Korea and students trending toward university studies, SMEs are faced with a loss of workers both because they are less attractive employers and because they cannot afford to educate and promote their employees. The public sector, therefore, helps supply skilled labor to SMEs through vocational education or training focusing on the field and practical work.

The junior college is the most advanced level of vocational education; its graduates represent the largest percentage of employment but their employment rate with EI-subscribed businesses is low and their transition period to the first job is longer than that of other training institute graduates. Though half of the graduates of junior college worked for small enterprises as their first jobs, 14.4 percent worked for businesses hiring more than 500 persons, which is comparatively higher than those of other institutions' graduates. The major occupations of their first jobs included: clerks and service workers, shop/market sales workers, and technicians and associate professionals. Because of relatively high wages and longer tenure, the proportion of junior college graduates that separate voluntarily from their place of employment is smaller than those of other institutions.

Table 44. Summary of Results

	Craftsmen Training Program (One Year)	Technician Training Programs (Two Years)	KCCI Two-Year Course	Junior College
Employment Rate A1 ¹	57.6	61.5	84.4	81.0
Employment Rate B2 ²	20.3	34.5	60.9	29.1
B/A	35.2	56.1	72.2	35.9
First Job				
Employment within 2 Years ³	48.5	59.0	82.5	62.4
Average Transition Period ⁴ (months)	5.8	3.9	1.5	6.6
Main Occupation	- Craft and trades- related workers - Elementary occupations	- Technicians and associate professionals - Clerks - Craft and trades- related workers - Elementary occupations	- Technicians and associate professionals - Craft and trades- related workers - Elementary occupations	- Technicians and associate professionals - Clerks - Service workers and shop / market sales workers
Enterprise Size	30-99 persons	30-99 persons	30-99 persons	1-29 persons 500 persons
Relative Wage	100	110.0	103.5	112.1
Average Tenure (months)	15.6	21.6	23.3	21.3
Voluntary Job Separation	88.6	84.0	86.9	80.3

Note: ¹Employment Rate A is the employment rate of graduates in 2001 as announced publicly by each Institute (or Ministry of Labor). It is the proportion of employed among all graduates. ²Employment Rate B is the rate of all the graduates as of June 2001 who were employed under the employment insurance system, as calculated using the EI database. ³First job within two years" is defined as the 2001 graduates who were employed by March 1, 2003. ⁴Average transition period is the average of transition periods to "first job within two years."

Source: Combined sources of tables 31 and 33.

IV. IMPLICATIONS

In this chapter, the labor market achievements of pre-employment VET institutions were analyzed from various perspectives, using the official data from each institute, the Youth Panel from the Korea Employment Information Service (Youth Panel), and Korea Education and Employment Panel from the Korea Research Institute for Vocational Education and Training (KEEP), and the employment insurance database (administrative data). Even though the past VET system in Korea, which had contributed to fast economic development, could not be analyzed because of a shortage of data, we could suggest some useful points to developing countries trying to rebuild both their vocational education and higher education at one time only by analyzing the present VET system in Korea. The analysis results give us the following implications.

Firstly, the function as the ultimate educational institute of vocation education of the secondary education stage will decrease as the economy grows and evolves into a knowledge-based economy. The vocational high school in Korea contributed to economic development by nurturing and supplying the technical production labor needed by enterprises during the high growth period. However, as the society enters into the knowledge-based economy, higher education becomes popular, with only 20 percent of the vocational high school graduates entering the labor market directly, whereas 70 percent of them proceed to higher educational institutions. This phenomenon well reflects the point that the skill level required by the labor market is gradually increasing, so that vocational education at the secondary education level cannot satisfy demand.

Secondly, the importance of vocational education at the higher education stage is on the rise with respect to this change. As the society moves to be a highly skilled one, the role of the junior college becomes more important in developing technicians and technologists with greater skill and proficiency levels than the technician provided previously by the vocational high school. In Korea, the number of the junior college students increased continuously until 2000 when the drop in school age affects the trend.

Thirdly, vocational education at the secondary and tertiary stages must be well linked and integrated. As pointed out previously, the large proportion of students proceeding to higher education institutions among vocational high school students does not imply that the vocational high school is no longer needed. Because 60 percent proceed to junior college, vocational education at the secondary and tertiary stage appears to be well linked.

However, in terms of the content, from the perspectives of the educational process the practical association is not made. This situation can be explained by the fact that there is no big difference in labor market achievements among junior college graduates from the vocational high school and those who graduated from the general high school. Some junior colleges implement programs that link the training course of the vocational high school but its effect is insignificant, as it does not reach the level of distribution and settlement.

Fourthly, the role of public vocational training is still meaningful, in order to supplement any market failure in the supply of labor. Generally speaking, while the role of public vocational training will decrease as the economy grows, the role of government will not become unnecessary. The KoPos and the HRD of KCCI, which were described earlier in this paper, are the public vocational training institutions that develop and provide technical production labor for small and medium size businesses. Even though small and medium size businesses suffer from a labor shortage, it cannot afford to internally educate the necessary human resources, and the private vocational education institutions cannot train enough human resources. The public sector develops human resources for small and medium size businesses through vocational education centered on in-the-field practice, and the percentage of employment by these institution graduates is large, which implies that an unsatisfied demand exists in the labor market.

In short, developing countries have to rebuild VET system of secondary education stage to be well linked with labor market and also establish VET system in the post-secondary education stage. In particular, it is necessary to provide in-depth VET chance for excellent vocational high school graduates, linking well VET system at secondary with VET system at post-secondary stage.

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Summary Findings

The Korean vocational education and training (VET) system is heralded as one of the key factors contributing to the country's past economic growth. VET has played an important role in developing a skilled labor force during Korea's economic development. However, with the increasing importance of higher education and general education, the status of VET in the country is declining. This paper explores recent Korean data to analyze the labor market outcomes of pre-employment VET institutions. The findings show that current vocational high school education is not associated with better labor market outcomes, in terms of employment rate, wage levels, prospect of permanent employment, and transition to the first job, when compared to general high school education. Among VET programs, we find that graduates of higher level, more comprehensive VET programs experience greater labor market achievements than graduates of less competitive, shorter programs. We also find that the VET institutes play an important role in supplying technical labor to small and medium enterprises (SMEs).

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